

ABSTRACT OF THE DISCLOSURE

A tissue biopsy device uses ultrasonic imaging to guide the biopsy needle. An ultrasonic imaging device comprises three acoustically coupled chambers with an ultrasound transducer in a first chamber, at least a portion of an ultrasound detector in the second chamber and the portion of patient anatomy to be imaged placed in the third chamber, which is intermediate the first and second chambers. The three chambers are filled with an acoustically transmissive liquid. One or more of the end walls dividing the first and third chambers and second and third chambers may be movable to form compression plates that are used to retain the patient anatomy in a fixed position during the imaging and biopsy process. When a structure, such as a lesion, has been located, the imaging may be used to determine the precise location of the lesion in three dimensions. The ultrasonically transmissive fluid is drained from the central third chamber with ultrasonic coupling occurring through the ultrasonically transmissive compression plates and the imaged patient anatomy. This permits real-time imaging of the patient anatomy during the biopsy process. The three-dimensional coordinates are used to provide a manual guide for insertion of the biopsy needle. Light bars may be projected onto the external anatomy of the patient to indicate the desired point of entry of the biopsy needle. The physician may use the real-time imaging to view both the lesion and the biopsy needle. In an alternative embodiment, a biopsy needle may be automatically positioned at the location of the lesion by a three-dimensional positioning system.